REMARKS

Claims 1-30 are pending in this application.

The Examiner rejected claims 3 and 6 under 35 U.S.C. Section 112, first paragraph, as failing to comply with the enablement requirement. The Examiner stated that while claims 3 and 6 recite a metallic mirror as a substrate, a mirror by definition does not transmit any light. Applicant respectfully traverses the rejection.

Claim 3 recites that the base substrate is a metallic mirror (element 110 in FIG. 1 for example). In that case, all of the light is reflected by the metallic mirror. However, the light waves are still retarded by the layer of periodic index regions 130. In other words, there is no requirement that light has to be transmitted through the birefringent device.

As for claim 6, it recites that the cap layer is a metallic mirror. In that case, all of the light coming from under the base substrate is reflected by the metallic mirror. However, similar to claim 3, the light waves are retarded by the birefringent region (layer of periodic index regions 130 in FIG. 1). Thus, Applicant submits that both claims 3 and 6 are clear and definite.

The Examiner rejected claim 11 under 35 U.S.C. Section 112, second paragraph, as being indefinite for failing to specify which dimension of the periodic region is aligned with the liquid crystals. Applicant has amended claim 11 to recite that the at least one region is substantially aligned "*perpendicularly to the direction of alternation of refractive indices*". In other words, the liquid crystals in the at least one region are aligned in the x-direction along the groove as shown in FIG. 7. Support for this amendment is in page 19, lines 8-16 of the specification.

More substantively, the Examiner rejected claims 1-2, 4-5, 7-8, 13-23, 26 and 30 under 35 U.S.C. Section 103(a) as being obvious over Unno (US Patent Pub. No. 2003/0128349) in view of Lee (US Patent No. 6498679). Applicant respectfully traverses the rejection.

As described in paragraph 94 of Unno, the grating structure of FIG. 8 in Unno is known. However, one problem of such structure is that optical efficiency is sufficiently low as to make it impractical for the market place. For example, FIG. 8 of the present specification shows that transmission efficiency associated with TE field varies from approximately .94 to 1.00 while transmission efficiency associated with TM field varies from

.94 to .95. According to one feature of the present invention, this problem is solved by use of a cap layer (substrate) which will be explained, by way of example only, with reference to particular figures and portions of the present specification.

As shown in FIG. 1A (not drawn to scale), the cap layer 120 is an optical thin film (see page 23, lines 7-10) which is provided to substantially increase the optical efficiency of the light wave retardation device 100. As described in page 24, lines 13-19 and shown at FIG. 7, the design of the cap layer 120 and base 110 is such that R_{110} (light reflected from the base layer) and R_{120} (light reflected from the cap layer) may be approximately equal and substantially out of phase. The law of conservation of energy in conjunction with the above cancellation produces an effect akin to that found in anti-reflection coating technology wherein successive reflections substantially cancel out, thereby maximizing the amount of transmitted radiation through device 100. As compared to FIG. 8, FIG. 9 shows the substantial improvement where the transmission efficiency associated with both TE and TM fields vary from approximately 0.975 to 1.0.

To make this cap layer feature clearer, Applicant has amended claim 1 to read "a cap ~~substrate~~ layer having an optical thin film . . ." None of the cited references teach such a novel feature. Incidentally, in all claims, the phrase "said layer" refers to "a layer of periodic index regions" while "said cap layer" refers to "a cap layer".

As the Examiner correctly noted, Unno fails to teach an optical thin film cap layer. The Examiner then relied on the Lee reference for the cap layer and concludes that the cap layer in Lee can be combined with the Unno device. Applicant respectfully submits that Unno cannot be properly combined with Lee because they use fundamentally different technology to produce birefringence.

In Lee, the technology involved is a polymer technology in which a plastic film is doped with molecules and then stretched in one direction to produce birefringence. By contrast, the technology involved in the Unno device is a grating technology in which a periodic regions of alternating refractive indices generates form birefringence. Accordingly, Applicant submits that Lee is not relevant to the present invention as claimed in claim 1.

Moreover, claim 1 now recites the cap layer is an optical thin film. Applicant submits that none of the cited references teach or suggest such a feature.

The Examiner further asserted that Unno teaches a birefringent device 25 having a layer of periodic index regions of alternating refractive indices. The Examiner further asserted that Unno teaches a birefringent device which has a thickness of about 27 microns. Applicant respectfully disagrees.

The Examiner pointed to Unno's birefringent device 25 as having the layer of periodic index regions (series of vertical walls as shown in FIG. 8) recited in claim 1. The birefringent device 25 is part of a first embodiment. However, the birefringent device 104 that has a thickness of about 27 microns is part of a fourth embodiment (see FIG. 28 and paragraph 59 of Unno) which is quite different from the first embodiment. Specifically, the birefringent device 25 of the first embodiment (see FIG. 8) has a series of vertical walls that provide the alternating refractive indices. By contrast, the birefringent device 104 having the 27 micron thickness of the fourth embodiment (see FIG. 28) has a parallel flat plate (see paragraph 143 and FIG. 28 of Unno) without any vertical walls. As such, the birefringent device 104 (FIG. 28) is quite different in construction from the birefringent device 25 (FIG. 8).

Thus, it is improper for the Examiner to point to one device for some elements (layer of periodic index regions) of a claim and then point to a different device for remaining elements of the same claim. In other words, just because the device 104 of FIG. 28 having the flat shape can be made with 27 micron thickness does not mean a birefringent device 25 of FIG. 8, which is quite different in construction, can be made with the same thickness.

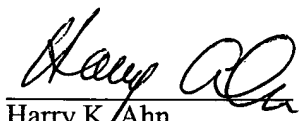
Even if Unno can be combined with Lee, the combination still does not produce the invention as claimed in claim 1 because the combination still does not produce a birefringent device having both a layer of periodic index regions and a thickness of less than about 10 microns.

Dependent claims 2, 4-5, 7-8, 13-23, 26 and 30 are also patentable by virtue of their dependency from independent claim 1.

The Examiner also rejected remaining claims 9-12, 24-25 and 27-29 as being obvious over two or more of the following references: Unno, Lee, Shurtz (US Patent No. 4712881), Sutherland (US Patent Pub. No. 2004/0137204). Applicant submits that those claims are patentable by virtue of their dependency from independent claim 1.

Based upon the above amendments and remarks, Applicant respectfully requests reconsideration of this application and its earlier allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,



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